

NOTE ON THE CARBONIFEROUS GONIATITE *GLYPHIOCERAS  
VESICULIFERUM*, DE KONINCK SP.

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Read 14th January, 1916.

IN 1910, in the Proceedings of the Yorkshire Geological Society, Dr. Wheelton Hind described and figured (vol. xvii, part 2, pp. 106, 107; pl. vi, figs. 2, 2a, 2b), from the "Carboniferous Limestone of Elbolton, near Cracoe, Yorkshire (Upper Dibunophyllum zone)", the only example of De Koninck's *Goniatites vesiculifer* which he had found during his many years' work on the Carboniferous Limestone of Great Britain and Ireland. The differences, however, between his description and that of De Koninck were so great that I wrote to Dr. Hind expressing a wish to see the specimen. He very kindly granted my request, and my best thanks are due to him for the loan of the fossil.

The specimen is very well represented in Dr. Hind's figures 2 and 2a.

In his description<sup>1</sup> of the species De Koninck clearly states<sup>2</sup> that it was when the shell had lost its last whorl that on each side of the peripheral area could be seen a longitudinal vesicular band which was formed during the growth of the animal. These bands are raised and attain a relatively considerable size,<sup>3</sup> forming a very prominent feature in a specimen which has lost its body-chamber. They are apparent on the floor of the body-chamber, and have their greatest height at the base of the body-chamber, their height gradually decreasing towards the aperture of the shell; they seem to be of a vesicular character, their surface having a reticulated appearance. They evidently existed from an early stage, and since they were not absorbed during the growth of the animal, as the animal grew forward in its shell and formed new septa, the dorsal (inner) edge of each septum necessarily crossed these bands. When therefore the outer whorl (including not only the body-chamber but some of the septate part of the shell) is removed, leaving its floor attached to the preceding whorl, these longitudinal bands are seen to be crossed by the adherent

<sup>1</sup> L. G. de Koninck, Ann. Mus. Roy. Hist. Nat. Belgique, Sér. Paléont., tom. v (Faune du calc. carb. Belgique, pt. ii). 1880, p. 109, pl. xlix, figs. 10, 11.

<sup>2</sup> His actual words are: "Lorsque la coquille a perdu son dernier tour de spire, on aperçoit sur chacun de ses côtés une bande longitudinale saillante composée d'une innombrable quantité de petites vésicules, qui s'est formée pendant le développement de l'animal; ce dépôt donne à la section de la spire une forme particulière que je n'ai rencontre chez aucune autre espèce de *Goniatites*."

<sup>3</sup> Being between 4 and 5 mm. wide and about 2 mm. high where the diameter of the shell is about 20 mm.

dorsal edges of the septa. This appears to us to be the aspect presented by Dr. Hind's specimen, for notwithstanding its size (22·5 mm. in diameter) the fossil has evidently lost not only its body-chamber but also nearly a complete whorl of the septate part of the shell, whilst the floor of the missing septated portion and that of the posterior portion of the body-chamber still adheres to the penultimate whorl. We venture to think, then, that Dr. Hind's description is based upon a specimen which has lost its body-chamber and nearly a complete whorl of its septated part, whilst De Koninck's description refers to a shell possessing the outer whorl, the aspect of the shell in these two conditions being entirely different.

Thus De Koninck describes the peripheral arc as regularly convex (*régulièrement arquée*), the aperture of the shell as semilunar and nearly as wide as high, whilst Dr. Hind states that "the periphery is broad, gently convex, separated on each side from an inflated margin by a longitudinal sulcus", and that "below the rolled margin the side of the whorl is flattened and depressed", De Koninck's description evidently referring to the outer whorl of the shell, and that of Dr. Hind to the penultimate whorl after the removal of the outer whorl.

Again, De Koninck mentions only incidentally the nature of the surface of the test, observing, in comparing his species with Phillips' *Goniatites stenolobus*, that in *Goniatites stenolobus* one never meets with the vesicular matter with which the surface of *Goniatites vesiculifer* is covered (*chargé*).

Now Dr. Hind describes the 'ornamentation' as follows: "The sides of the shell are adorned by a number of small, elevated curved radiating costæ, which pass from the edge of the umbilicus and become lost on the swollen band. Between the ribs the lateral surface is covered with numerous regular longitudinal lines. The surface of the inflated part is finely punctate. Test thin." A close examination of the fossil shows that the surface of each longitudinal band is reticulated, these reticulations passing on the peripheral side into fine irregular transverse striæ, and on the lateral area into fine more or less regular transverse striæ crossed by somewhat coarser and fairly-regular longitudinal (spiral) striæ, giving the surface between the band and the edge of the umbilicus a finely-cancellated appearance, the longitudinal lines being somewhat stronger than the transverse. The reticulated and the cancellated surfaces are crossed at fairly regular intervals by the dorsal edges of the septa of the outer whorl, which has been subsequently removed. Our explanation, therefore, of the 'ornamentation' described by Dr. Hind is that it refers to the floor of the outer whorl as it appears attached to the penultimate whorl when the rest of the whorl is removed, the so-called 'curved radiating costæ'<sup>1</sup> on the side of the shell being the dorsal edges of the septa of the missing outer whorl. Having submitted this interpretation of the feature of the specimen to Dr. Hind it is

<sup>1</sup> It may also be pointed out that these costæ constitute the broad curve on each side in the drawing of the suture-line given by Dr. Hind.

satisfactory to be able to state that he considers it highly probable that this interpretation is correct.

The condition of Dr. Hind's fossil already mentioned explains the chief difference between the suture-line figured by him and that figured and described by De Koninck, for whilst De Koninck has described and figured that portion of the septal suture which is usually figured and described, viz., the portion extending from the umbilicus on one side over the periphery (or venter) to the umbilicus on the other side, that is to say, its lateral and ventral portions, Dr. Hind has figured the edge of the septum as it appears on the inside of the dorsal (inner) portion of the outer whorl, when the floor of this whorl remains attached to the penultimate whorl on the removal of the outer whorl itself; that is to say, he has figured the dorsal portion of the septal suture<sup>1</sup> (see Fig. 1, D). Portions, however, of the peripheral and lateral parts of the septal sutures are visible near the anterior end of the specimen on the natural internal cast.<sup>2</sup> They are indicated in the accompanying figure (Fig. 1, A). Unfortunately some of the peripheral surface of the specimen has here been ground away, so that the course of the septal suture cannot be traced over the peripheral portion of the natural internal cast, but this portion of the septal suture can be seen at a point a little further back (where the shell has a diameter of 18.4 mm.) on the median portion of the periphery, and is shown in the accompanying figure (Fig. 1, B). The septal suture, so far as it can be made out, is reproduced in the accompanying figures (Fig. 1, A-D).

The measurements of Dr. Hind's specimen are: Diameter of shell, 22.5 mm. (100); thickness of whorl, 12.5 mm. (55.5); height of whorl, 11.5 mm. (51); ditto above preceding whorl, 7.0 mm. (31.1); width of umbilicus, 3.0 mm. (13.3). The corresponding measurements of De Koninck's specimen as taken from his figure are: Diameter of shell, 19 mm. (100); thickness of whorl, 10.5 mm. (55.2); height of whorl, 10 mm. (52.6); ditto above preceding whorl, 5.25 mm. (27.5); width of umbilicus, 3.0 mm. (15.7). It will thus be seen that the relative dimensions of the two specimens agree fairly well.

Notwithstanding the differences, therefore, which are apparent between De Koninck's description and that of Dr. Hind, we think these can be satisfactorily explained, and that the English fossil is certainly very near to, and probably identical with, De Koninck's species.

The horizon and localities of this species given by De Koninck are the Carboniferous Limestone of Visé, Belgium (assise VI), and the Carboniferous Limestone of Settle, Yorkshire. The specimen described and figured by Dr. Hind was from the Carboniferous Limestone of Elbolton, near Cracoe, Yorkshire (Upper Dibunophyllum

<sup>1</sup> The broad curve on the lateral area of the whorl figured as part of the septal suture is also described by Dr. Hind as part of the ornament of the shell.

<sup>2</sup> These are indicated in Dr. Hind's fig. 2 by the curved lines close to the anterior end and in front of the longitudinal vesicular ridges.

zone), and the same author desires me to say that since writing his paper he has recognized in the collection of Mr. John Smith, of Dalry, Ayrshire, five examples of the species from Poolvash in the Isle of Man.

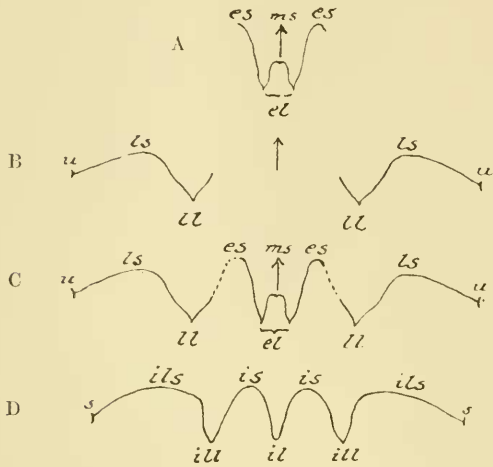


FIG. 1.



FIG. 2.

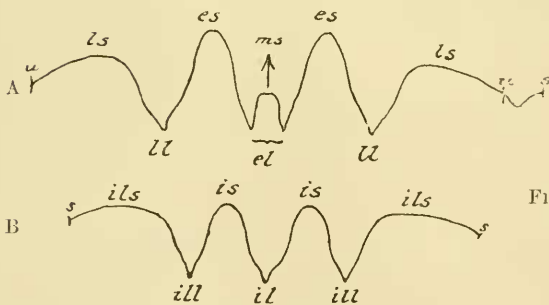


FIG. 3.

FIG. 1.—*Glyphioceras vesiculiferum* (L. G. de Koninck).

A, median part of the ventral portion of a septal suture,  $\times \frac{2}{1}$ .

B, the lateral portions of the ventral part of another septal suture,  $\times \frac{2}{1}$ .

C, composite figure of the ventral portion of the septal suture, formed by combining Figs. A and B, the dotted portion being supplied.

D, the dorsal portion of the septal suture.

Drawn from a specimen in the collection of Dr. Wheelton Hind, from the Carboniferous Limestone of Elbolton, near Cracoe, Yorkshire, figured in Proc. Yorkshire Geol. Soc., vol. xvii, part 2, 1910, pl. vi, figs. 2, 2a, 2b.

FIG. 2.—Reproduction of de Koninck's figure of the septal suture of his *Goniatites vesiculifer*.

FIG. 3.—*Glyphioceras sphericum* (W. Martin).

A, ventral and lateral portions of a septal suture,  $\times \frac{2}{1}$ .

B, the dorsal portion of a septal suture,  $\times \frac{2}{1}$ . For comparison with Fig. 1, C and D.

Drawn from the example, from the Carboniferous Limestone of Derbyshire, figured by J. Sowerby, Min. Conch., vol. i (part 10, April, 1814), p. 116, pl. liii, fig. 2, now in the British Museum collection [no. 43871].

In all the figures *el* = external (or ventral) lobe; *es* = external saddle; *il* = internal (dorsal, columellar or antisiphonal) lobe; *ill* = internal lateral lobe; *ils* = internal lateral saddle; *is* = internal (or dorsal) saddle; *ls* = lateral saddle; *ms* = median (or siphonal) saddle; *s* marks the position of the suture of the shell; and *u* indicates the position of the margin of the umbilicus. The arrow marks the median line of the peripheral area and points toward the aperture.

There is also an example in the British Museum Collection [Geol. Dept., register no. C. 18509], but unfortunately the locality is unrecorded. It is much smaller than Dr. Hind's example, being only 12.5 mm. in diameter. It is well preserved, though incomplete, being composed of only the septated part of the shell. On the periphery of the youngest part of the last whorl, immediately in front of the present anterior end of the specimen, the dorsal edge of the last septum is clearly seen, showing that the specimen lacks the whole of the body-chamber. The longitudinal vesicular ridges are quite prominent, extending on one side of the shell over the whole length of the outer whorl and on the other side to within a short distance of the anterior end of the specimen, being highest at the commencement of the whorl and gradually decreasing in passing forwards, until near the anterior end each becomes little more than a relatively coarse meshwork on the periphero-lateral surface of the specimen. On the peripheral side each vesicular ridge passes into somewhat coarse transverse rugæ, which soon become very indistinct, and in turn pass into exceedingly fine transverse lines which occupy the greater part of the median area; whilst on the umbilical side each ridge passes into very fine rugæ, the whole of the lateral area being crossed also by exceedingly fine longitudinal lines, imparting to this portion of the fossil a very fine cancellated appearance. The portions of the peripheral area adjacent to the vesicular bands bear also extremely fine longitudinal lines, which at the anterior end of the specimen seem to pass beneath the vesicular band, and to be lacking on the median portion of this area. The surface of the anterior end of the specimen bears exceedingly fine growth-lines, which have an almost radial direction on the inner half of the whorl, form a shallow sinus on the outer half, an obtuse crest

on the periphero-lateral area, and a broad shallow hyponomic sinus on the periphery. These growth-lines probably constituted the only ornaments of the test.

The meshwork surface passing into the fine irregular striæ on the peripheral area and into the finely-cancellated structure on the lateral area doubtless represents the so-called 'Runzelschicht' or 'wrinkle-layer', which has been recognized and described in quite a number of ammonoids, and which is comparable with the structure in the recent *Nautilus* known as the 'black-layer', which is seen on the peripheral surface of the early part of the last whorl and immediately in front of the aperture.